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IN TWO SECTIONS

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N.A.C.A. LIBRARY

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EDITORIAL DEPARTMENT NOTE

This is the first of two Bulletins dealing with the problems of accounting for and controlling the costs of automobile and truck operations. Motor transportation has become of such great importance to American industry that the problem of costing and controlling the costs of motor vehicles have come to the front rapidly. The first article in this Bulletin offers a plan of accounting for a fleet of company-owned cars used by salesmen. The author points out that the method outlined by him may not fit all situations, but presents it as a case study of how one company uses accounting to control the costs connected with a fleet of company-owned cars. The second article raises some most important questions as to the basis for measuring and comparing the costs of truck operations. It would be interesting to have for the Forum Section of the Bulletin the comments of others who have had experience with this problem.

Robert K. Chambers, the author of our first article, is a graduate of Lancaster Boys High School and obtained his accounting training from La Salle Extension University. For the past eleven years he has been connected with the Armstrong Cork Co., Lancaster, Pa., engaged in factory accounting, auditing and corporation accounting. For the past three years he has instructed Armstrong classes in accounting subjects. Mr. Chambers is Associate Director of Publications for our Reading Chapter.

The author of the second article is C. F. Rasmussen, who graduated from the School of Engineering of the University of Wisconsin in 1923. After several years' experience with paper mills he became Assistant Sales Manager of the Walker Truck Mfg. Co., a subsidiary of Yale and Towne. In addition, he has worked as an engineer with A. C. Neilsen & Co. of Chicago, and is now City Sales Manager for the Premier Pabst Corp. of Milwaukee.

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NATIONAL ASSOCIATION OF
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MAY 15, 1937

EXPENSE CONTROL FOR AUTOMOBILE FLEETS

By Robert K. Chambers, Supervisor,
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Lancaster, Pa.

IN ORDER to realize the importance of proper control of the expense incurred in the operation of a fleet of automobiles, one needs only to realize that every year salesmen travel millions of miles. It is time that we give careful consideration to this type of expense. Until a few years ago many fleet operators were still experimenting in a confused manner with not only the method to be employed in controlling and recording this type of expense, but also the policy to be followed in deciding who should stand the enormous cost necessary to finance the purchase and replacement of cars used for sales purposes.

In reading this article it is well to keep in mind that the experience of one company may not be a fair criterion for another. For, in the preparation of this article, it was found that there was such a wide divergence of policies that it was very difficult to make more than a few general statements as to what should or should not be done. The following article will deal first of all with some of the policies which might be called general principles or fundamentals for controlling this type of expense. The latter part of the article will deal specifically with an actual set of forms and the system used by the Armstrong Cork Products Co. The system as outlined has been used successfully for several years and may serve as a model for other companies utilizing the same policies. However, the writer wishes to make it clear that the policies described and conclusions reached in this article are not necessarily those of the Armstrong Cork Products Co. It is wise to repeat that there have been very few companies utilizing a common policy. However, there has been a noticeable trend in the last few years toward a standardization not only of policies but also of forms utilized in recording this expense. There has also been a greater agreement on those items, both direct and indirect, which make up the total cost of operating a fleet of cars.

Naturally we are inclined to look upon this problem primarily from an accounting standpoint, because a well managed fleet of

salesmen's automobiles requires accurate and thorough accounting records. However, in discussing this problem it is necessary that we begin with various questions whose answers are to a large extent dependent upon complete and accurate cost figures.

Company-Owned Cars vs. Salesmen-Owned Cars

This question can best be answered by establishing two main groups. An analysis shows that the bulk of salesmen-ownership is found among the smaller fleets of aproximately fifty cars or less. In fleets of fifty cars or more it has been found that it is more economical and practical to have the cars company-owned. Several years ago it was common practice to have the cars owned by the salesmen, but in the last few years there has been a definite trend toward company-owned cars.

In order to decide the better method for each respective company there is only one method to follow and that is to establish a definite system of accumulating cost figures and after these figures are determined, to analyze them and determine the most practical policy. On the basis of cost per mile, the balance is in favor of company-owned cars. There are in operation today a few sizable fleets under the system of salesmen-owned cars, but it is not surprising that their operating costs, where they are worked out on a scientific basis, are slightly higher than the cost of fleets of company-owned cars.

However, after making a general study of the various types of car ownerships, there are a few general arguments in favor of company-owned cars which are commonly acknowledged. These arguments are:

1. That the company is left free to determine the make and type of car most suitable for their purpose.
2. It permits standardization of purchase, method of handling operating expenses, and also replacements. It enables a company to take advantage of fleet owners' discounts.
3. It has been definitely proved that company-owned cars are more economical to operate.

On the other hand, the advantages claimed for salesmen-owned cars are as follows:

1. It is felt that salesmen take better care of their own personal property than that of the company.
2. It eliminates the necessity of the company making a heavy investment.
3. It eliminates the question of the right or practicability of salesmen using a company-owned car for purposes other than business.
4. It is felt that a fixed allowance saves a lot of labor which might be expended on filling out forms and accumulating the expenses in making out reports in the office. However, as a counter argument it should be stated that the paying of a flat rate to a salesman for the operation of his personally-owned car does not eliminate the necessity of studying his operating costs. This study of operating costs should be made both from the standpoint of the company and the salesman, either to prove or disprove the fairness of the flat allowance which is being granted.
5. It is sometimes argued that a salesman will do small jobs on his own car in his spare time, whereas, in the case of a company-owned car he would turn it over to a mechanic. Although this might be true, it is generally agreed that if a car is serviced in a reputable garage it will be serviced very much better than if an individual takes that responsibility on himself.

Operating Expenses

During the last few years the operating costs of automobiles were being gradually lowered, contrary to the popular opinion. This decrease in operating cost was due largely to the lower initial investment, lower depreciation, better cars, drivers, tires, roads, and, generally speaking, a reduction in the cost of fuel.

However, it is evident that with the current increase in prices, especially those relating to the automotive industry, the average cost per operating mile will show a gradual increase. With this increase in cost and a continual growth of companies utilizing fleet equipment some collective effort should be made to standardize the accumulation of cost figures.

It appears strange that at the present time it is very difficult to definitely state an average cost per mile figure which can be gen-

erally used. The reason for this difficulty is that so few companies figure expenses on a comparable basis. This is less true today than it was two or three years ago, but there is still considerable work to be done in the establishment of comparable figures.

One of the most common faults found in the accumulation of cost figures is the failure to include depreciation, taxes and insurance. Even those companies who include depreciation as an added cost in the operation of their cars use different rates of depreciation which naturally affect the cost per mile. Until a few years ago it was common practice to depreciate automobiles on a three-year basis, but it was found that under this plan a car when traded in could usually be disposed of at a profit. In other words, the actual value obtained was greater than the residual value as reflected on the books. This condition has been corrected by some companies by depreciating their cars over a four-year period.

Since depreciation is one of the largest items in automobile operation, and is relative to time and not to mileage, it is, of course, apparent that the more miles covered in the given time the lower will be the item of depreciation per mile. The resulting reduction in cost is equally important whether the car is company-owned or salesmen-owned. In the case of a company-owned car the cost is reflected directly on the cost sheet; and in the second instance it directly effects the amount of the fixed mileage allowance that is granted to the salesman. It is therefore important from the viewpoint of depreciation that the car make the highest possible effective mileage in the shortest possible time.

It is imperative that the operating costs of fleet cars include not only the direct expenses such as gas, oil and repairs, but also the fixed expenses such as depreciation, insurance and taxes. It is unfortunate that some companies do not make an effort to study the actual operating costs of their fleet but accept the average resulting from a general investigation of other companies or bureaus. This acceptance of someone else's figures is unfair both to the company and to the salesmen, for it is very difficult to find two sizable fleets operating under similar conditions and policies. As a general rule, however, operators are realizing that the most practical and economical method for both salesmen and companies is an expense account where the company pays actual operating costs.

Replacement

In the study of the operating costs on fleet automobiles we find that one of the contributing factors, which at the same time is affected by the cost figures, is the policy with regard to trading in fleet cars. It has been noted that there is a marked tendency to replace these cars on an average of every two years, especially in the case of the lighter cars. It is common knowledge that the trade-in value of a car is dependent upon its life rather than the mileage. However, this is not always entirely true, due to serious accidents which might affect the general structure of a car, or the fact that the car itself may be what is commonly known as a "lemon." The abnormal cost of operating such cars will be reflected on the cost records and they should be traded in at the first opportunity. It has been found that there is a general tendency to trade in cars at the end of two years, or when the car has run about 35,000 miles.

Accumulation of Cost Data

Assuming that the automobile has been established as a sales asset, and that it is generally agreed that it is practical to have the fleet of cars company-owned and company-operated, our next consideration is the method to be used in accumulating the operating expenses.

There are certain essential factors involved in the successful operation of all automotive equipment, which may be summed up in the phrases "maximum of service" and "efficiency in economy of operation." Although the company actually owns the fleet, nevertheless the responsibility for the efficiency and economy of operation rests largely upon the operator of the equipment. It is his duty to maintain this equipment in good working order, to have the car properly serviced when the need is presented and to have all costs intelligently and properly reported. Operating costs as applied to automotive equipment are of two classes: variable costs and fixed costs.

Variable costs consists of items for which the operator is more or less directly responsible and include the cost of gasoline, oil, tires, repairs, greasing, washing, storage and other miscellaneous expenses incidental to the operation of the automobiles. Items in

EXHIBIT "A"

REQUEST FOR AUTOMOBILE PURCHASE

This form should be used when requesting approval to trade in a car on a new model (coupe or two-door sedan). The information called for below should be filled in and mailed to the Divisional Sales Office at Lancaster together with bids (on our form No. 2506) from two competitive dealers each on....., ..., and ..... cars. All bids submitted should include safety glass all round. Bids from ..... dealers should cover both their ..... and ..... Models. Bids from ..... and ..... dealers should be submitted on ..... Models only.

Date.....

.....	.....	.....
Division	Branch Office	Salesman
.....	.....	.....
Year	Make of Car	Type of Model to Be Traded in
.....	.....	.....
Motor Number	Serial Number	Total Mileage Car Has Been Driven

.....
General Condition of Car

.....
Approximate Reconditioning Cost if New Car Is Not Purchased

Salesman's first and second choice in relation to bids being submitted:

Dealer	*Make of Car*
1st choice.....	1st choice.....
2nd choice.....	2nd choice.....

Approved by.....
Branch Manager

Approved by.....
Divisional Manager

Car Recommended for Purchase by
Purchasing Department

Approved by Executive Committee

....

EXHIBIT "B"

DEALER'S QUOTATION

Armstrong Cork Products Company
Lancaster, Pennsylvania

Date.....

.....
Dealer's Name Street City State

....
Make of Car Model (Coach or Coupe) Year

Factory List Price		$.....
Equipment (List Items Separately)		
Bumpers	$.....	
Tire & Tube	$.....	
Tire Cover	$.....	
Tire Lock	$.....	
Knee-Action	$.....	
	$.....	
	$.....	
Total Equipment	$.....	$.....
Freight & Handling		$.....
Tax { Federal		$.....
Tax { State		$.....
Total		$.....
Allowance on Used Car		$.....
Net Cash		$.....

This information should be filled in by the Branch Office requesting this quotation.

Dealer's Signature.....

Division .....

Branch Office .....

Salesman .....

EXHIBIT "C"

Date.....

TO ACCOUNTING DEPARTMENT:

Kindly fill in the information requested below at your earliest convenience and return to:.....

....
Division Branch Office Salesman

....
Year Make of Car Type of Model to Be Traded in

Total mileage car has been driven.....
(As reported by Salesman)

Total mileage car has been driven.....
(According to Accounting Department Records)

Cost per mile.....

Personal mileage.....

Net business mileage..... Net Cost per business mile.....

Date car was purchased.....

Original cost.....

Book value (current)..... As of.....

(SIGNED).....
Accounting Department

Name Reporting
Division
Dept. or Branch
From 19 To 19
Approved by
Branch or Departmental Manager

WEEKLY EXPENSE REPORT

Date

CASH FROM OFFICE

Date	Amount	Date	Amount

CASH SUMMARY

Balance from Report of 19	
Total Cash Received	
Total	
Less Disbursements	
Balance on Hand	

SELLING AND TRAVELING EXPENSES

Date	City	Hotel	Meals No.	Meals Amt.	Railroad Fare	Pullman Fare	Auto	Taxi/Air Plane	Tips	Gasoline	Entertainment Items	Entertainment Total C. Fare	Laundry	Valet	Meals	Other Exp.	Remarks	Daily Total
5/2		3 00	3	2 25			2 45		45							50		8 65
5/3		3 50	3	2 60			1 70		60					75		50		9 65
5/4		2 50	3	2 45			3 97		50				50					9 92
5/5			3	2 50			6 75		60							60		10 35
5/7							12 00				EXHIBIT "D"							12 00
Totals		9 00		9 80			26 87		2 15				50	75		1 50		50 57

NOTE: Travel Instructions on Reverse Side

Less Personal Mileage

DETAILED AUTO EXPENSES

Date	Business Miles	Personal Miles	Gasoline Gals.	Gasoline Cost	Oil Qts.	Oil Cost	Storage	Tire Repairs	Repairs Misc.	Auto License	Grease	Wash	Reading Odometer		Acct. Code C.P.D.	Acct.	Mdse.	Oper.	Clear.	Amount
5/2	120	20	9	1 45								1 00	Reading Beginning of Week	16 440						
5/3	128	25	10	1 70									Total Miles	563						
5/4	100	25	20	3 97					6 75				Personal Miles	170						
5/5	85												Business Miles	423						
5/7							12 00						Reading Odometer	16 440						
	433	170	42	7 12			12 00		6 75			1 00		(4 87)						

Circle Charged Items and Show Total Quantities Purchased as Indicated (*)

Mdse. No.

this group should be accurately reported by the operator to the home office according to the system which will be shortly outlined.

It will readily be seen that the operator is not responsible for fixed costs (depreciation, insurance, taxes). Therefore, he is not asked to report fixed costs, with the exception of the cost of licenses.

Since the items of fixed expense are under the direct control of the company and are not reported by the operator, the accuracy of the operator's cost figures is dependent almost entirely upon the operator himself. The following forms represent the complete system in use by the Armstrong Cork Products Co. from the time a request for an automobile is made, until the time the automobile is retired from active service.

Requests for Automobile Purchase

When a salesman decides that either through wear or tear, or for some other reason, his particular car should be replaced by a new one, he submits to the home office the form outlined in Exhibit A. This form, together with several bids (Exhibit B) is of invaluable help in deciding whether or not a new car is to be purchased.

After the receipt of the above stated forms, the sales manager requests the information outlined in Exhibit C. It might be well to state at this point that unless the repairs are abnormally high within a short period, the decision as to whether a car is to be traded in depends largely on the number of months the car has been in service. However, if the operating cost of a particular car when compared with the general average appears to be excessive, it is a warning that probably the car is either mechanically defective or inefficiently operated.

The sales manager considers the information contained in Exhibits A, B and C and from these figures determines whether or not it would be economical to trade and buy at that particular time,

Weekly Expense Report

By referring to the weekly expense report illustrated in Exhibit D, you will note that the reporting of the automobile operating expenses is made as simple as possible. As the salesman makes out his weekly expense report it is necessary that he also

make out the detailed auto expense section in the lower left-hand corner, which must tie in with the totals shown in the auto column. In the detailed auto section you will note that there is a space for the mileage reading at the beginning of the week. This, of course, must correspond with the reading at the end of the week shown on his previous report. During the week he enters his daily business and personal mileage and also his various expenditures classified under the proper heading. Although it is more desirable to handle auto expense on a cash basis, nevertheless there are times when, as a matter of necessity or convenience, it is better to purchase items on a charge basis. In this case there is provision in the detailed auto expense section to note any charge purchases of gasoline and oil or any other item of expense. This will assist the accounting department in determining an accurate cost of operation, for if these charge items were not shown it would have a serious effect upon such cost.

When making out the expense report the salesman must, of course, reimburse the company for his personal mileage. This is handled by taking the personal mileage and multiplying it by the rate per mile and showing the result of $4.80 in the respective space on the report. In Exhibit D you will find the total actual expense as $50.57 from which has been deducted the amount of $4.80 which leaves a net amount of $45.77 for which the salesman will have to be reimbursed.

Whenever possible the items of expense should be supported by a formal receipt. This is particularly true in the case of unusual items of repairs as it is important that the repairs be properly watched and analyzed in order to be on the lookout for any cars that are mechanically defective. Repairs will sometimes disclose information pertaining to accidents which the salesmen may feel reluctant to report.

Cost Sheet

After the weekly expense reports have been received and checked, the detailed auto expense is posted to the automobile expense cost sheet shown in Exhibit E. This sheet accumulates the weekly totals of the actual variable expense as reported by the salesman. When posting from the weekly detailed auto section, the cash and charge items are combined into one total. You will

CAR NO. NAME DIVISION BRANCH

Date 1936	Odometer Reading	Mileage Total	Business	Personal	Gasoline Gals	Cost	Oil Qts.	Cost	St'ge.	Tires	Repairs	carbon valves	brakes	bearings	body fenders	electric	general tighten	misc. adjust's	Grease	Wash
Jan. 4	6257	60	60		5	.84			12.00	(Dec. "5)										
	6339	82	82																	
	6627	288	288		15	2.52	5	1.79	.25											
	6677	50	50																	
	6913	236	236		15	3.00			12.00											
Feb. 3	6938	25	25		5	1.06														
	7174	236	236		16	3.01			12.00	EXHIBIT "E"										
	7469	295	295		22	4.42														
	7850	381	381		31	6.08														
	8117	267	225	42	10	1.96														
Mar. 28	8243	126	126		17	3.33	5	1.75	12.00		11.40		✓		✓		✓			
	13648																			
July 10	13890	242	242		25	4.70	5	1.79		13.71	5.84		✓			✓	✓	✓		
	14430	540	540		32	5.94														
	14767	337	212	125	25	4.64														
	15887	1120	1120		55	9.65	5	1.75												
	16440	553	433	120	42	7.12			12.00		6.75		✓			✓	✓	✓		1.00
Aug. 14	16900	455	.0	455	34	6.64														
	17170	270		270	10	1.80				.75										
	20481	400	100		20	3.61			2.00		6.63		✓				✓	✓		
	20842	361	361		34	6.33	1	.36	12.00											
Dec. 3	21067	225	225		13	2.42														
	21279	212	172	40	12	2.24	5	1.75			23.87	✓	✓			✓	✓	✓		
	22065	786	786		48	8.61	1	.25	1.75		5.51				✓				2.25	
	22485	420	250	170	28	4.90	5	1.79												
Dec. 31	22635	150	50	100	10	1.85														
TOTALS		16438	14055	2383	1052	195.63	52	25.87	158.75	14.46	69.85								2.25	2.00

OPERATING COSTS FOR COMPANY CARS

OPERATING COSTS FOR COMPANY CARS

PERIOD JANUARY 1 TO DECEMBER 31, 1936 ..... DIVISION

Branch .....
Salesman .....

Make and Date Purchased	June 27, 1933	May 8, 1936	Nov. 10, 1935	June 30, 1935	Feb. 15, 1936	Dec. 13, 1936	June 17, 1936	April 30, 1936	April 22, 1936	Dec. 6, 1935	July 8, 1935	May 20, 1935	July 27, 1935	Aug. 24, 1935	Oct. 30, 1933	SUMMARY OF ALL CARS
Business Miles ..	5,254	15,144	17,139	9,809	23,135	24,049	26,757	13,412	11,258	24,820	13,397	13,404	23,808	14,055	8,777	244,218
Personal Miles ..	0	26	376	1,705	2,260	1,263	1,801	1,256	877	2,180	1,332	1,249	46	2,383	685	17,439
Total Miles	5,254	15,170	17,515	11,514	25,395	25,312	28,558	14,668	12,135	27,000	14,729	14,653	23,854	16,438	9,462	261,657
Mileage per Gal. Gas	13.2	16.6	14.8	14.4	16.2	15.8	15.7	16.8	14.7	17.3	15.5	16.2	17.8	15.6	14.5	15.9
Mileage per Qt. Oil	262.7	182.8	128.8	205.6	195.3	197.8	250.5	261.9	263.8	391.3	237.6	271.4	236.2	316.1	131.4	221.9
VARIABLE COSTS																
Gasoline	.0126	.0102	.0124	.0125	.0110	.0120	.0124	.0110	.0125	.0104	.0111	.0123	.0105	.0119	.0124	.0114
Oil	.0011	.0018	.0023	.0016	.0016	.0016	.0012	.0009	.0010	.0008	.0010	.0010	.0018	.0016	.0021	.0014
Tires	....	.0001	.0002	.0040	.0003	.0016	....	.0002	....	.0004	.0011	.0024	.0018	.0009	.0012	.0009
Repairs and Misc. Exp.	.0003	.0016	.0095	.0039	.0018	.0061	.0019	.0057	.0010	.0008	.0038	.0059	.0024	.0042	.0027	.0035
Greasing	.0002	.0006	.0007	.0011	.0010	.0010	.0002	.0009	.0009	.0009	.0001	.0007	.0007	.0002	.0005	.0007
Washing	....	.0006	.0010	.0011	.0012	.0007	.0002	.0008	.0003	.0006	.0007	.0013	.0004	.0001	.0003	.0006
Total Variable Costs	.0142	.0149	.0261	.0242	.0169	.0230	.0159	.0195	.0157	.0139	.0178	.0236	.0176	.0189	.0192	.0185
FIXED COSTS																
Depreciation	.0089	.0060	.0079	.0149	.0055	.0070	.0049	.0061	.0160	.0066	.0086	.0097	.0068	.0093	.0140	.0080
Insurance	.0062	.0033	.0022	.0034	.0015	.0015	.0010	.0015	.0027	.0011	.0017	.0017	.0011	.0037	.0064	.0021
License	.0002	.0002	.0009	.0009	.0006	.0005	.0004	.0008	.0010	.0004	.0009	.0009	.0006	.0009	.0014	.0007
Storage	.0059	.0048	.0106	.0135	.0067	.0063	.0035	.0008	.0004	.0043	.0069	.0108	.0032	.0097	.0150	.0063
Total Fixed Costs..	.0212	.0143	.0216	.0327	.0143	.0153	.0098	.0092	.0201	.0124	.0181	.0231	.0117	.0236	.0368	.0171
Total Cost per Total Mile	.0354	.0292	.0477	.0569	.0312	.0383	.0257	.0287	.0358	.0263	.0359	.0467	.0293	.0425	.0560	.0356
Cost per Business Mile	.0354	.0292	.0478	.0598	.0304	.0382	.0247	.0277	.0354	.0251	.0355	.0473	.0293	.0429	.0573	.0353
Total Expense 1936 Mileage	$186.00	$443.66	$835.02	$654.91	$792.69	$970.27	$732.78	$420.99	$434.02	$710.21	$528.61	$683.64	$698.89	$698.60	$530.24	$9,320.53
Less Personal Mileage Reimbursement	....	.84	15.04	68.20	90.40	50.52	72.04	50.24	35.08	87.20	53.28	49.96	1.84	95.32	27.40	697.56
Expense 1936 Business Mileage	$186.00	$442.82	$819.98	$586.71	$702.29	$919.75	$660.74	$370.75	$398.94	$623.01	$475.33	$633.68	$697.05	$603.28	$502.84	$8,622.97
Total Mileage on Cars as of Dec. 31, 1936	57,145	15,170	18,264	21,620	22,925	460	19,402	14,668	9,575	28,500	21,621	24,064	34,149	22,635	31,641	

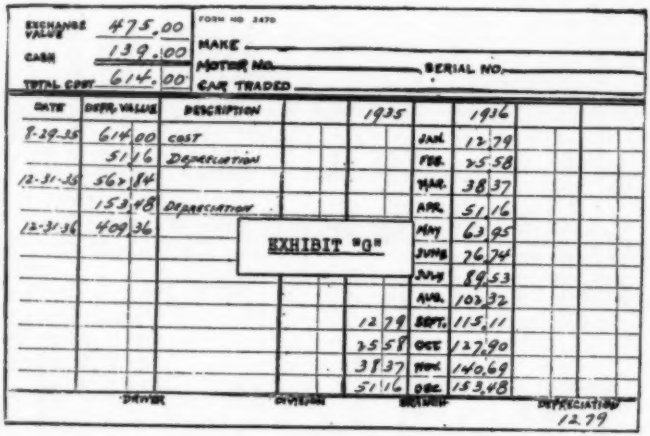
EXHIBIT "F"

further note that repairs are classified under several headings. The amount is entered in the column headed "Repairs" but space is provided for a check mark to be placed opposite the amount in order to classify the various repairs. This cost sheet is kept in an active file and is used to determine the variable cost per mile. If you will refer to the entry on the cost sheet opposite the reading of "16,440" you will note the posting as it is entered from Exhibit D.

Since these figures are almost worthless without comparison with other figures, we shall follow further the actual determination of the operating cost of the car under consideration, and show how it enters into the comparative reports.

Yearly Operating Costs

The figures posted and totaled on Exhibit E are the basis for the amounts shown in Exhibit F. The totals of the columns representing the cost items are divided by the total mileage of 16,438, which results in the rate per mile. These you will find shown on Exhibit F under the column marked with an arrow. Exhibit F shows the comparative operating costs of the fleet cars in one of the selling divisions. It also shows the cost of the cars in the various cities. You will be able to trace the figures from Exhibit E to Exhibit F without any difficulty down to the figure for fixed cost.


EXCHANGE VALUE 475.00
CASH 139.00
TOTAL COST 614.00
FORM NO 2470
MAKE
MOTOR NO. SERIAL NO.
CAR TRADED

DATE	DEPR. VALUE	DESCRIPTION	1935		1936	
8-29-35	614 00	COST		JAN.	12 79	
	51 16	DEPRECIATION		FEB.	25 58	
12-31-35	562 84			MAR.	38 37	
	153 48	DEPRECIATION		APR.	51 16	
12-31-36	409 36			MAY	63 95	
				JUNE	76 74	
				JULY	89 53	
				AUG.	102 32	
			12 79	SEPT.	115 11	
			25 58	OCT.	127 90	
			38 37	NOV.	140 69	
			51 16	DEC.	153 48	

EXHIBIT "D"

DRIVER DIVISION DEPRECIATION 12.79

The first item under the fixed cost section is depreciation. As the cars are depreciated on a four-year basis, we refer to the card shown as Exhibit G. This represents an inventory card for this particular type of fixed asset and is used to record the monthly and accumulated depreciation. By referring to Exhibit G we find the depreciation for 1936 was $153.48 which, divided by 16,438 miles, gives us a rate per mile of $.0093. The yearly insurance and license expense is divided by 16,438 miles, which gives us the rate per mile for insurance and licenses. You will note in Exhibit F that the storage expense is shown as a fixed item. In cases where the automobile is stored under a monthly rental charge, it is more truly presented as a fixed item than as a variable expense, and for this reason it is shown under the fixed cost section. By adding the

SUMMARY OF OPERATING COSTS OF ALL COMPANY-OWNED CARS OPERATED BY SALESMEN AND COVERING 1936 ACTIVITY

Make of Car						
Number Used	57	86	28	1	1	All Cars 173
Business Miles	757,049	1,279,415	521,691	25,445	9,745	2,593,345
Personal Miles	42,837	65,838	16,861	1,855	280	127,672
Total Miles	799,887	1,345.253	538,552	27,300	10,025	2,721,017
No. of Gallons Gas.	55,371	88,348	36,058	1,796	727	182,300
No. of Quarts Oil	5,253	6,899	3,258	73	50	15,533
Miles per Gallon Gas	14.4	15.2	14.9	15.2	13.8	14.9
Miles per Quart Oil.	152.3	195.0	165.3	374.0	200.5	175.2
VARIABLE EXPENSE						
Gasoline	$10,038.76	$15,904.30	$ 6,625.44	$332.20	$138.17	$33,038.87
Oil	1,501.12	1,999.29	958.31	22.63	15.63	4,496.98
Tires	1,083.01	2,506.50	896.91	44.22	3.15	4,533.79
Repairs & Misc. Exp.	3,581.98	5,065.20	2,005.23	63.60	33.72	10,749.73
Greasing	602.23	1,109.34	439.71	17.42	11.00	2,179.80
Washing	433.17	794.51	360.80	10.60	8.25	1,607.33
Total Variable Expense	$17,240.37	$27,379.14	$11,286.40	$490.67	$209.92	$56,606.50
FIXED EXPENSE						
Depreciation	$7,754.59	$12,246,07	$ 4,608.80	$201.50	$159.40	$24,970.36
Insurance	2,231.68	3,331.33	1,036.87	30.12	19.85	6,649.85
License	436.62	797.76	340.41	9.75	5.47	1,590.01
Storage	3,888.38	6,959,98	2,648.15	121.40	1.50	13,619.41
Total Fixed Expense.	$14,311.27	$23,335.14	$ 8,634.23	$362.77	$186.22	$46,829.63
Total Operating Expense	$31,551.64	$50,714.28	$19,920.63	$853.44	$396.14	$103,436.13
Less: Personal Mileage Reimbursement	1,927.71	2,962.71	758.75	83.48	12.60	5,745.25
Net Total Operating Exp.	$29,623.93	$47,751.57	$19,161.88	$769.96	$383.54	$97,690.88

EXHIBIT "H"

total variable expense of $.0189 and the total fixed expense of $.0236, we arrive at a total cost per mile of $.0425. This total cost per mile of $.0425, multiplied by the total mileage will, of course, give us the actual amount of $698.60. Deducting from this figure the amount of personal reimbursement of $95.32, we arrive at the amount of $603.28, the actual expense of the business mileage. The amount of $603.28, divided by the business miles gives us the rate of $.0429 per mile. The figures for the various cars on this report are then carried to the final column where a summary and average of all cars in that division is shown.

By referring to Exhibit F we find that many interesting comparisons can be made. We have purposely omitted the names of the salesmen and the make of their respective cars for obvious reasons. However, the mileages and rates per mile are actual figures that can be studied and compared. However, a more complete picture can be obtained by referring to Exhibits H and I.

SUMMARY OF OPERATING COSTS PER MILE OF ALL COMPANY-OWNED CARS DURING YEAR 1936

Make of Cars Number Used	57	86	28	1	1	All Cars 173
Business Miles	757,049	1,279,415	521,691	25,445	9,745	2,593,345
Personal Miles	42,838	65,838	16,861	1,855	280	127,672
Total Miles	799,887	1,345,253	538,552	27,300	10,025	2,721,017
No. of Gallons Gas..	55,371	88,348	36,058	1,796	727	182,300
No. of Quarts Oil...	5,253	6,899	3,258	73	50	15,533
Miles per Gallon Gas	14.4	15.2	14.9	15.2	13.8	14.9
Miles per Quart Oil.	152.3	195.0	165.3	374.0	200.5	175.2
VARIABLE EXPENSE						
Gasoline	.0125	.0118	.0123	.0122	.0138	.0121
Oil	.0019	.0015	.0018	.0008	.0016	.0017
Tires	.0014	.0018	.0017	.0016	.0003	.0017
Rep'rs, & Misc. Exp.	.0045	.0038	.0037	.0024	.0034	.0039
Greasing	.0007	.0008	.0008	.0006	.0011	.0008
Washing	.0005	.0006	.0007	.0004	.0008	.0006
Total Variable Exp.	.0215	.0203	.0210	.0180	.0210	.0208
FIXED EXPENSE						
Depreciation	.0097	.0091	.0086	.0074	.0159	.0092
Insurance	.0028	.0025	.0019	.0011	.0020	.0024
License	.0005	.0006	.0006	.0004	.0005	.0006
Storage	.0049	.0052	.0049	.0044	.0001	.0050
Total Fixed Exp....	.0179	.0174	.0160	.0133	.0185	.0172
Total Operating Exp.	.0394	.0377	.0370	.0313	.0395	.0380
Less: Personal Mileage Reimbursement	.0024	.0022	.0014	.0031	.0013	.0021
Net Total Operating Expense	.0370	.0355	.0356	.0282	.0382	.0359

EXHIBIT "I"

Summary of Operating Costs of all Company Cars

By referring to the above mentioned Exhibits you will find a comparison of the operating costs of the various makes of cars both as to dollars and rate per mile. Here again the makes of cars have been purposely omitted. However, after accumulating the costs of the cars in the fleet and making comparison it stands to reason that a definite control will be obtained and that accurate figures will be available for any policies which might be considered.

Complete Automobile Record

This form (not illustrated) is a detailed record of the car from the time it is put in service until it is finally retired. It is an optional record for those companies who desire to have a centralized file of pertinent information relative to each car and driver. However, this record is not entirely necessary in so far as similar information is reflected in Exhibits F and H.

When a car is retired from service the cost sheet, Exhibit E, the inventory card, Exhibit G, and the automobile record are removed from the active file and filed in a retired or out-of-service file.

In brief, these records should disclose information representing the original cost, all facts relating to its acquisition, the lifetime operation of the equipment and, finally, its removal from service.

Analyzing Cost Figures

It is apparent from the study of the cost figures in the various exhibits that the costs on one particular car are of little or no value unless they are compared with the general average. It is necessary, therefore, to study the cost figures and make logical explanations of those costs which are above the average. Of course, it is also interesting to know why certain cars are operated at costs under the general average. Accordingly, the accounting department makes a periodical report to the sales manager on any unusual cost items so that he in turn may take the proper steps to eliminate or decrease any excessive costs. These comparative figures reflect, as stated before, not only mechanical defects, but also a consistently inefficient driver. In order to show the great variety of conditions reflected by these comparative figures, we list below excerpts from an actual report on the operating activity of various cars. These

comments were taken from a report covering a selling division other than the one shown in Exhibit F. However, we can gather from the following comments the value of these comparative cost figures.

"The variable costs for Car #43 are slightly above normal, due to poor gas mileage, which contributes to the high gas costs. Repairs totalling $96.24 also tend to raise that item above average."

"Repairs in the amount of $139.74 produce a high mileage cost figure for this item on Car #50. High insurance premiums in —— cause this expense to be very high. Storage charges totalling $140 jump this cost far above average."

"Repair costs on Car #54 are high because of five jobs at approximately $20 each, which, combined with the minor repairs, brings this figure to $110 for the seven months' use."

"Although repair costs are above average for Car #62, it is really high fixed costs which jump this car far above normal. Subnormal mileage causes this condition."

"A major repair of $82.86 following a wreck, increases this item of cost exceptionally high for Car #63 used during January and February. Depreciation costs are also high due to low mileage."

"High storage charges, $151.61 for the year, show this cost to be considerably above normal for Car #68."

"Very low mileage for the year on Car #76 operated by Mr. —— is a factor in the high fixed cost picture. Poor gas mileage on this car also."

"Poor gas economy on Car #78 tends to raise this item far above the average set. Higher gas prices enter in, too."

"Low mileage on Car #84 creates a high depreciation cost which is instrumental in raising this car above the average for this group."

"Repair costs are high for Car #98. Purchases of chains, horn, heater and Prestone totalling $33.50; repairs after an accident costing $36 and numerous small

items, which together add to $135.26, bring about the high figure shown. Storage charges of $192.40 for the ten months indicate an extremely high cost for this fixed item."

"High insurance and storage charges tend to increase these items of costs greatly above average for cars #104 and #107. This partly contributes to high costs on #108 also."

"Depreciation costs on the cars #64, #79 and #110 are abnormal partly because of insufficient mileage and partly for the reason that delivered prices are considerably higher on cars at ——."

"Costs are very high on Car #113 tire expense because of the purchase of four tires; fixed costs due to sub-average mileage. Although no repair bill exceeded $13, the total for this expense was $66.65, which is high for the mileage traveled. Note that personal driving was greater than use for Company business. This, consequently, increases the cost per business mile, since the cost per total mile is $.07½ and the reimbursement but $.04."

"You will note that many of the salesmen might readily step up gas mileage to produce economy of operation."

"Gasoline mileage on Car #127 is poor at 12 miles per gallon, due probably to extensive city driving. Costs, generally, are very high, as you will note: gas, because of low mileage; tires, due to replacements at about 28,000; repairs, seemingly high, although highest billing only $12.75 and total only $40.13; fixed costs all high since such small mileage over the period of a year greatly increases mileage costs. Note particularly that storage costs alone are higher on this car than total operating costs on many of the cars. Storage charges of $180 for 6,150 miles."

"Our records indicate only seven oil changes on Car #133, accounting for the abnormal oil mileage. Apparently no serious damage appeared from this lack of regular practice in oil changes, for the repair cost is also considerably below average. Nothing was expended for washing, from which the writer infers that Mr. ——

washes and waxes the car himself. Total operating costs were low, for this car."

"Note excellent gasoline mileage on Car #137. Fixed costs on this car and on one previously operated by him are high due to low mileage for the period."

"Car #143 shows high oil costs due to great oil consumption. This motor must have been in poor condition. The repair costs might indicate major repairs, however, the $59.90 spent consists of numerous items. The picture for the car driven by Mr. —— the last half of the year is much better in every respect, as you may readily note."

"Tire replacements for Car #144 raise tire costs. No major repairs; however, the $40 expenditure for 7,600 miles of operation brings this item above normal. All fixed costs are high because of small mileage. Note that this auto costs the company *$.063 per mile.*"

"An accident to Car #148 at the close of the year makes repairs and total costs considerably above average. Increased mileage will tend to bring this car down to normal."

"Gasoline economy could be improved on Car #154 which Mr. —— operates. Possibly minor adjustments to the carburetor will aid in lowering the cost on this item."

"Sub-normal gas mileage on both cars operated by Mr. —— is quite a factor in his cost picture. We suggest that this should be improved upon by the dealer if such a condition exists on the new car which he is to operate. Numerous repairs on Car #159 tend to raise this expense above that shown for our average. Mr. —— seems, with very few exceptions, to have car washings weekly, which seems unnecessary in this locality, having no dirt roads to travel regularly. Greasing costs are also high. Most of the salesmen drive their cars 1,000 to 1,200 miles between lubrications."

The above comments are studied by the sales manager who in turn contacts the respective driver in order that the necessary steps be taken to correct the above conditions. It is only by this immediate follow-up that any tangible results may be effected in

reducing operating costs. If a salesman is operating consistently at a cost above the average and various suggestions are made in order to assist him in lowering these costs, any steps taken will be reflected on the subsequent comparative reports.

Summary

There are a few common conclusions that can be made from this article:

1. A detailed system of recording and analyzing salesmen's automobile expense is indispensable for controlling costs.
2. On fleets of approximately fifty cars or more, company-owned cars are more economical than a flat-rate allowance to salesmen for personally-owned cars.
3. The operating expenses should include depreciation, insurance and taxes for accurate and comparable costs.
4. The age of a car, generally speaking, governs the time of trade-in. Other elements are serious accidents and abnormal operating costs.
5. Comparative analysis of operating costs per mile is the basis of discovering discrepancies and excessive costs.
6. Actual savings will be effected through the continual co-operation of the salesmen, the sales manager and the accounting department.

WHAT IS THE OPERATING COST OF A TRUCK?

By C. F. Rasmussen, City Sales Manager,
Premier Pabst Corp., Milwaukee, Wis.

TO THE majority of truck operators and truck manufacturers this seems a question which is easily answered. The usual reply is something like this: "Truck number 20 operates for only 6.2 cents per mile."

It is the purpose of this article to prove that the "per mile" cost of a truck is misleading—is not a reliable basis for comparing the costs of several trucks.

The arguments and conclusions contained herein are based on actual time and cost studies of a fleet of seven 2 to 2½-ton trucks in the city delivery service of the Pabst Brewery, Milwaukee. Each truck is assigned to a definite part of the city; routes vary somewhat in length, but loads are about the same on all routes.

I should like to discuss these subjects:

1. Cost per mile varies inversely with the number of miles traveled per day, but
2. Total operating cost per month is substantially the same for trucks of comparable capacity, regardless of the number of miles covered.
3. As traffic congestion becomes more severe, or delivery stops become more frequent, the "per mile" cost of gasoline increases, but within certain limits.
4. The total amount of money spent for gasoline per month remains substantially the same regardless of the number of miles covered.
5. When stops are frequent no truck can make a high speed.

The operating costs mentioned in the paragraphs to follow contain all items of cost. Here is a typical monthly cost for a 2½-ton Diamond T truck with stake body:

Fixed Expense		
Depreciation	$23.15	
License and taxes	7.08	
Insurance	10.81	
Supplies and supervision	14.92	
Total fixed expense		$55.96
Variable Expense		
Gasoline	$25.38	
Oil	1.71	
Chassis repairs	19.51	
Body repairs	1.87	
Washing	.76	
Tires and tire repairs	13.55	
Total variable expense		$62.78
Total operating cost per month		$118.74

Cost per Mile vs. Cost per Month

The following table shows a wide variation in cost per mile, but an almost identical cost per month:

Truck No.	*Total Cost Per Month*	*Miles Travelled*	*Cost per Mile*
23	$117.05	691	$.169
24	118.74	1034	.115
26	113.82	1038	.1110
27	110.56	990	.112
28	120.58	1009	.119
29	124.94	1366	.091
63	114.76	906	.127

If we were looking at the cost per mile column only, we would naturally pick truck number 29 as the most economical, and number 23 as the most expensive. As a matter of fact truck number 29 makes one long trip per day, truck number 23 makes two, and delivers twice as much beer. We cannot say that truck number 29 is more economical, but on the contrary we can say that the cost of delivering a barrel of beer is only half as great on the short route.

Cost of Gasoline vs. Stops per Mile

Every one of us has heard this statement, "My car averages 20 miles to the gallon." We even read advertisements to the effect that Mr. Blank's new "Scortcher Eight" does 19.6 miles to the gallon. Possibly a modern car under ideal conditions will show

such power economy. Possibly a truck operating on a long haul at an economical and steady speed will travel many miles on a gallon, but when we study actual performance records, we find some apparently strange facts.

Each of the seven trucks herein discussed operates on the same route, with the same driver, day after day. The total cost of gasoline for a month, therefore, divided by the number of miles traveled in that month is an accurate measure of cost of gasoline per mile. Each truck is equipped with a service recorder, or time clock to measure the actual amount of time during which the truck is moving and to count the actual traffic and delivery stops.

Chart A at the end of this article is based on data so compiled. Notice that a truck in outlying territory, making only one stop every two miles (½ stop per mile), costs $.022 per mile for gasoline. But the truck in congested traffic, making two and one-half stops per mile, costs $.038 per mile for gasoline. Small differences in total load hauled, engine efficiency, etc., cause little variation in gasoline consumption. Undoubtedly, most of the gasoline is consumed to accelerate the truck and load from a dead stop to running speed, and little is required to keep the truck moving.

Chart B illustrates even stranger facts. In this case the total cost of gasoline per month is plotted against miles traveled per day. It seems almost unbelievable that a truck traveling twenty miles per day uses $18 worth of gasoline in a month, and one doing forty miles uses only $20. The extra twenty miles per day is covered for an almost negligible cost. The data upon which these two charts are based are not unusual. The writer has analyzed the cost and performance records of thousands of trucks during the past ten years and always arrives at this same conclusion.

Speed vs. Stops per Mile

Were you ever rolling along in your car at twenty miles an hour to have another car pass you at twenty-five or thirty M. P. H., only to stop at a red light at the end of the block? Then as the light turned to green you moved on through at your same speed and got way ahead of the speeder. This example, familiar to everyone, shows how unimportant high speed is in congested traffic where cars or trucks stop frequently for red lights, stop signs or for delivery.

Chart C shows the actual average speed of our group of trucks in frequent stop service; for instance, the truck which makes one stop in a mile averages 13.8 miles per hour; the truck making four stops in a mile averages only 5.8 miles per hour. Each truck is governed for a maximum speed of 35 miles per hour, but the fastest one (working in the suburbs) averages only 40 per cent of its top speed.

The actual average speed in each case was obtained by dividing the total miles traveled in a day by the total hours *traveling* time. Standing time is not included. Here is operating data for a specific truck:

Truck No. 23				
Left garage	7:30 A.M.			
Returned to garage	6:38 P.M.			
Elapsed time (1 hr. noon deducted)	10	hours,	8	minutes
Total moving time	3	"	47	"
Standing time	6	"	21	"
Total elapsed time	10	"	8	"
Miles travelled	32.2			
Stops	76			
Average speed in m.p.h.	8.5			
Average no. stops per mile	2.4			
Average minutes per stop	5.0			

Evidently we cannot expect a high average speed from a truck in city delivery services. This explains why so many dairies still use a horse and wagon. Delivery stops are so close together that a truck seldom gets out of low or second speed.

From the foregoing it is evident that "cost per mile" is misleading as a unit by which to measure truck economy. In my opinion these are the points of importance:

1. Only those trucks doing comparable work as to miles, loads and stops can be compared. The mechanical performance of a truck on a long country trip is so different from a city truck that the operating cost of one means nothing when compared with that of the other.
2. When a group of trucks of the same age are all working on routes of approximately equal mileage and loads, then that truck which *consistently* shows a lower operating cost is the more economical.

3. Inasmuch as it appears that the total operating cost (driver and helper not included) of any one of a group of trucks in similar city delivery work will be about the same as the total operating cost for any other in that group, it follows that:

The truck to buy is the one designed for convenience of loading and unloading, capable of rapid acceleration so that a maximum tonnage and maximum number of trips can be made without costly overtime.

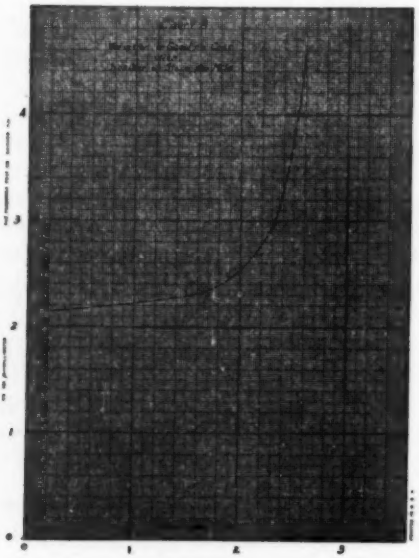


CHART "A"

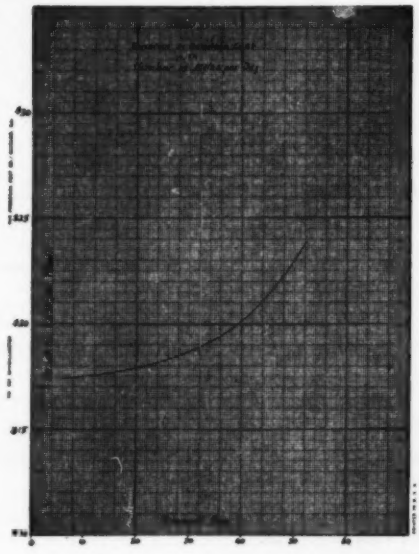


CHART "B"

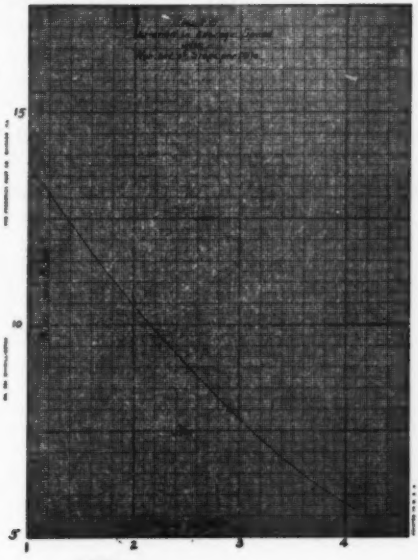


CHART "C"

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